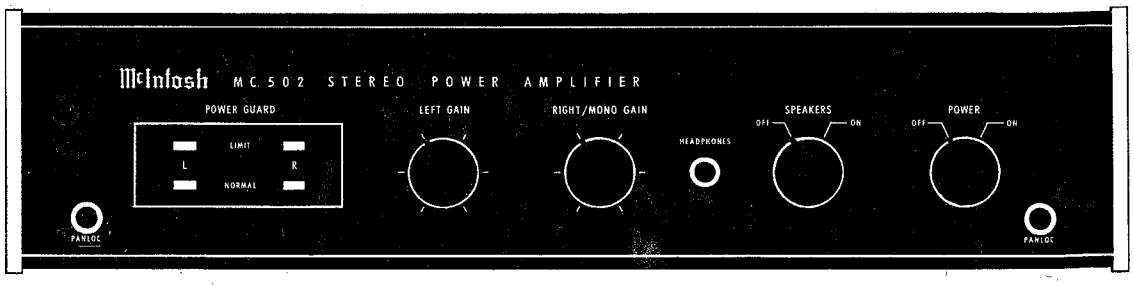
McIntosh

MC 502
POWER AMPLIFIER



SERVICE INFORMATION

STARTING WITH SERIAL NO. CE1001

McINTOSH LABORATORY INC. BINGHAMTON, NEW YORK 13903

039-100

MC502

PERFORMANCE LIMITS

PERFORMANCE

POWER OUTPUT RATING

STEREO-75 watts into 2.7 to 4 ohm loads, 50 watts into 8 ohm loads, minimum sine wave continuous average power output per channel from 20 Hz to 20,000 Hz, both channels operating.

Which is: 14.2 volts RMS across 2.7 ohms
17.3 volts RMS across 4 ohms
20.0 volts RMS across 8 ohms

MONO (Bridged)-150 watts into an 8 ohm load, minimum sine wave continuous average power output from 20 Hz to 20,000 Hz.

Which is: 34.6 volts RMS across 8 ohms

OUTPUT LOAD IMPEDANCE

STEREO: 2.7 to 8 ohms

MONO: 8 ohms obtained by connecting across the output terminals of both channels.

RATED POWER BAND

20 Hz to 20,000 Hz

TOTAL HARMONIC DISTORTION

STEREO: .02% maximum harmonic distortion at any power level from 250 milliwatts to rated power per channel from 20 Hz to 20,000 Hz, both channels operating.

MONO: .02% maximum harmonic distortion at any power level from 250 milliwatts to rated power from 20 Hz to 20,000 Hz.

INTERMODULATION DISTORTION

STEREO: .02% maximum per channel with both channels operating for any combination of frequencies, 20 Hz to 20,000 Hz.

MONO: .02% maximum at any power level from 250mW to rated power for any combination of frequencies, 20 Hz to 20,000 Hz

FREQUENCY RESPONSE (at one watt output)

20 Hz to 20,000 Hz, +0 -0.25 dB
10 Hz to 100,000 Hz +0 -3.0 dB

NOISE AND HUM

95 dB below rated output

RATINGS

OUTPUT VOLTAGES

25 volts for distribution lines

DAMPING FACTOR

Greater than 50

INPUT IMPEDANCE

75,000 ohms

INPUT SENSITIVITY

Switchable: 0.75 volt or 2.5 volts-Level control provided for higher input voltages.

GENERAL INFORMATION

POWER REQUIREMENTS

120 volts, 50/60 Hz, 0.2 to 4 amperes

MECHANICAL INFORMATION

SIZE: Front panel measures 16 inches wide (40.6 cm) by 3-5/8 inches high (9.2 cm). Chassis measure 14-3/4 inches wide (37.5 cm) by 2-3/8 inches high (6 cm) by 14-1/2 inches deep (36.8 cm), including connectors. Knob clearance required is 1-1/4 inches (3.2 cm) in front of mounting panel.

WEIGHT: 27 pounds (12.2 kg) net, 38 pounds (17.2 kg) in shipping carton

SCHEMATIC NOTES

1. Printed circuit board assemblies are outlined on the schematics by dotted lines. The circled numbers on the dotted lines correspond to the numbers on the printed circuit board layouts.
2. The heavy lines on the schematics denote the primary signal path.
3. The heavy dash lines on the schematics denote a secondary signal path.
4. Unless otherwise specified: Resistance values are in ohms, 1/4 watt, and 5% tolerance. Capacitance values smaller than 1 are in microfarads (μF); capacitance values greater than 1 are in picofarads (pF).
5. All voltages indicated on the schematics are measured under the following conditions:

   Use of an 11 megohm input impedance VTVM. — All voltages ± 10% with respect to ground.

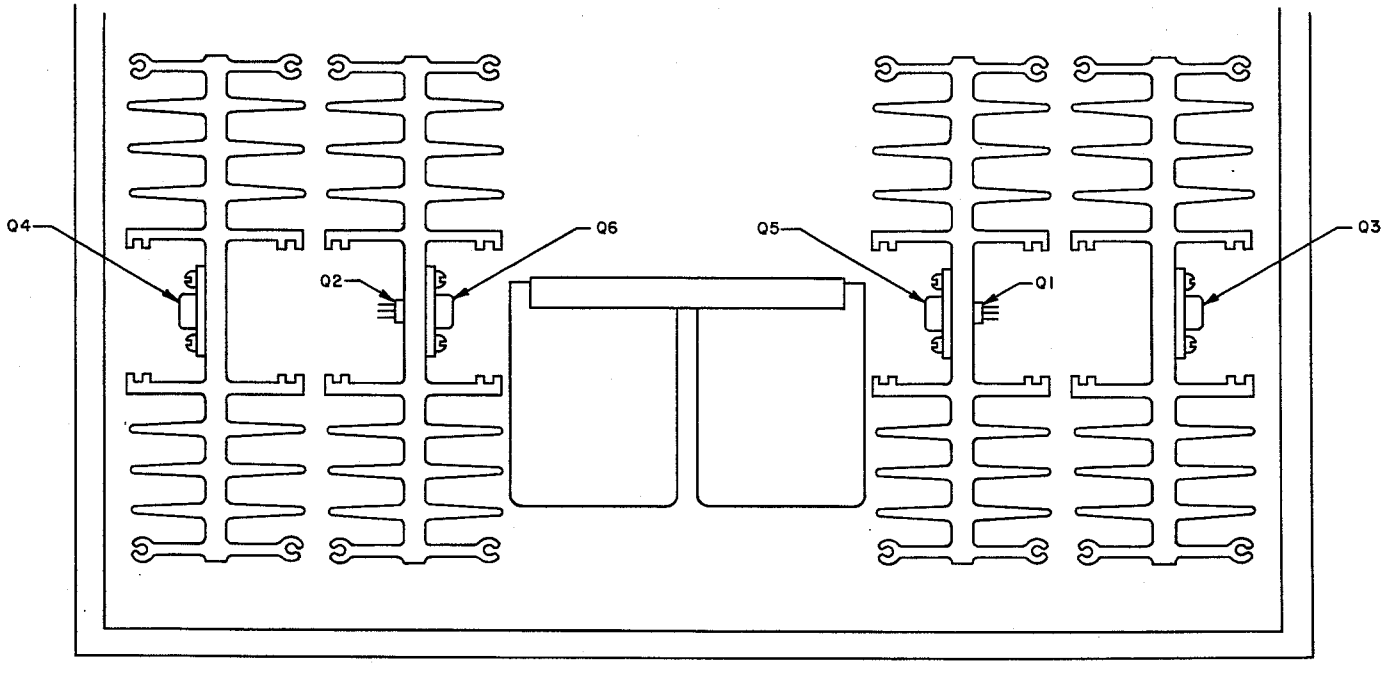
   No signal at input terminals. — AC input at 120 volts, 50/60 Hz.

   Voltages not specified are "0" volts.

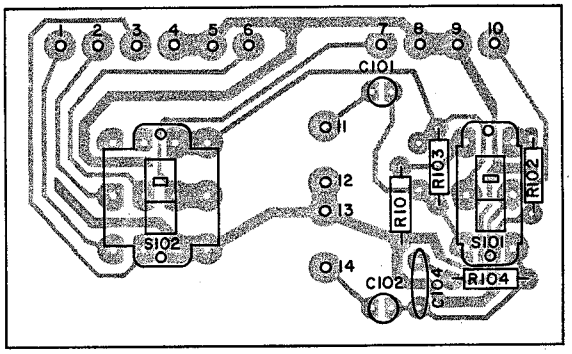
6. Front panel controls at:

		Rear panel switches at:	
Power	On	Input Level	2.5 V
Speakers	On	Mode	Stereo
Left Gain	ccw		
Right/Mono Gain	ccw		

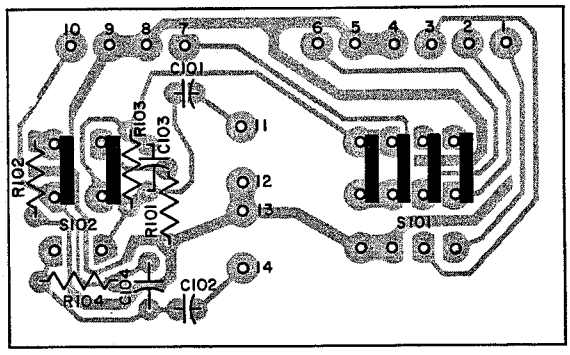
7. Bias adjustment:
   a. Operate amplifier at high power (approximately 50 watts) for about 2 minutes to warm the amplifier.
   b. Remove the input signal and turn R351 and R352 controls full ccw. Bias must be adjusted soon after the input signal is removed while the amplifier is still hot.
   c. Measure the line input power (approximately 25 watts) or current (approximately 0.2A).
   d. Rotate R351 bias control cw until the line input increases by 3.5 watts or 0.03 amps.
   e. Rotate R352 bias control cw until the line input increases by an additional 3.5 watts or 0.03 amps.

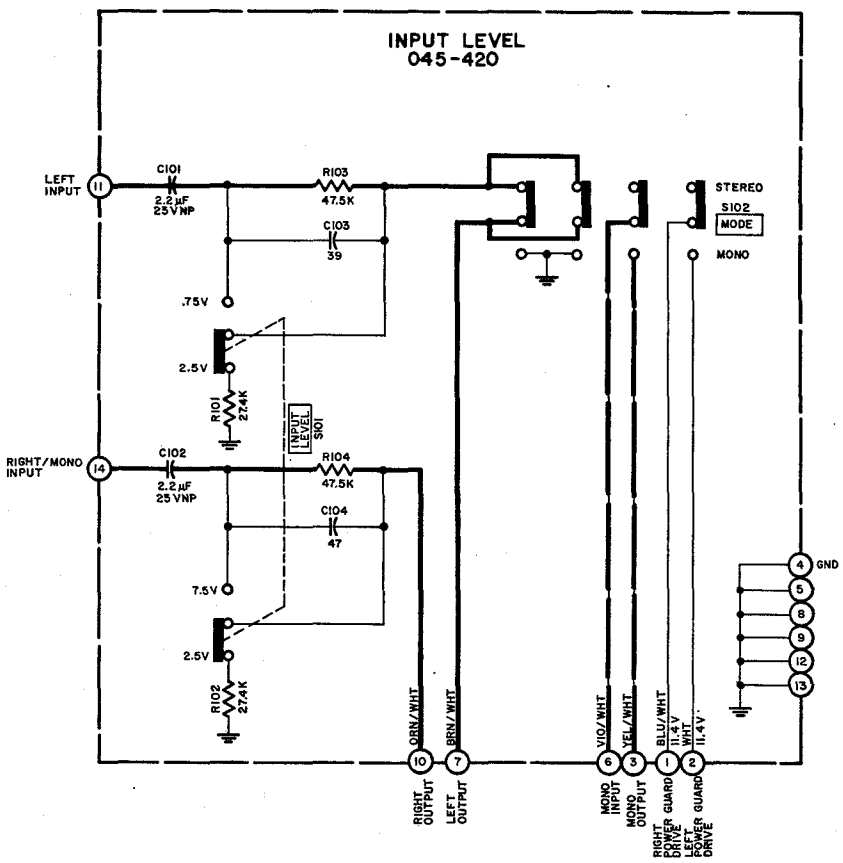


TOP—REAR
LOCATION OF TRANSISTORS NOT ON PC BOARDS

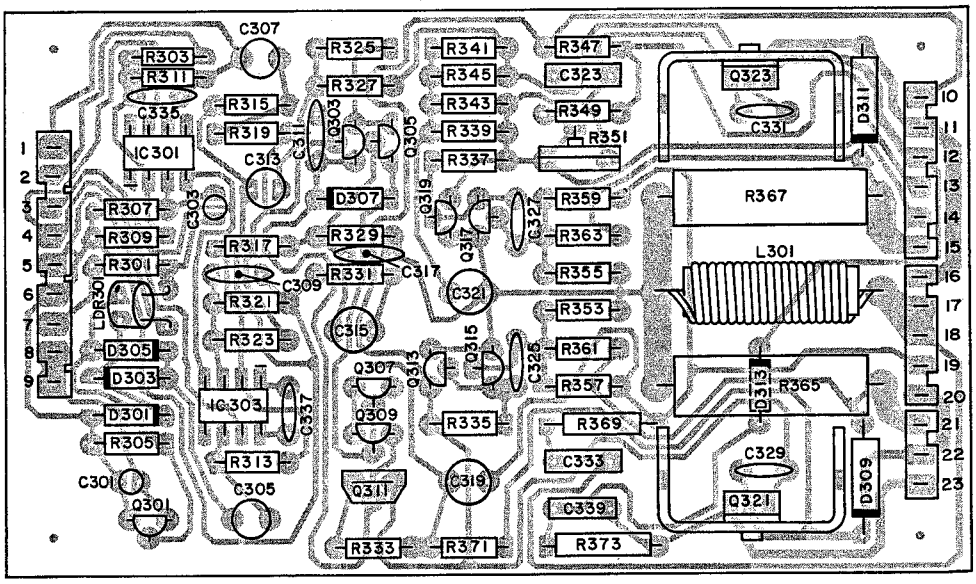


INPUT LEVEL PC BOARD
045420

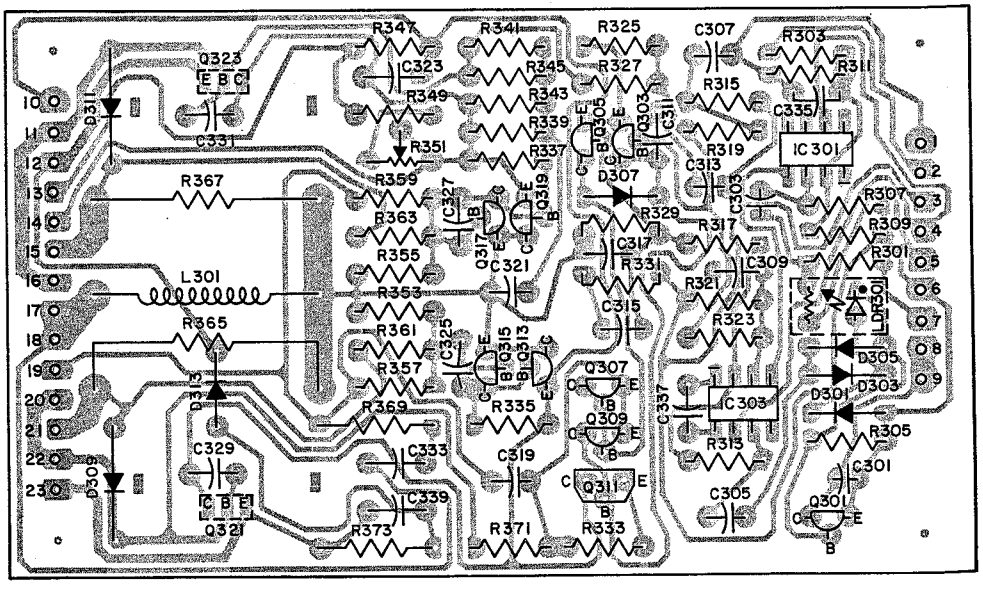


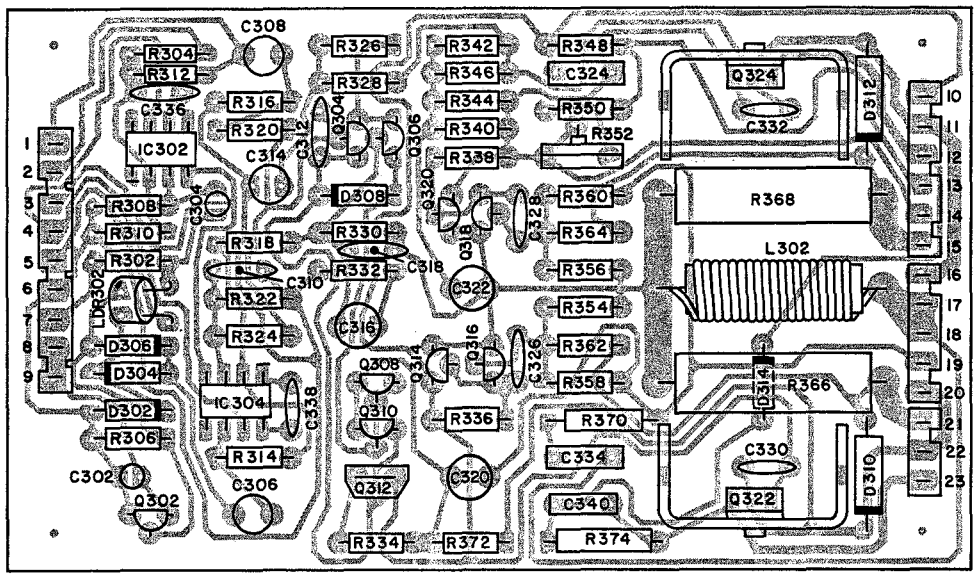

INPUT LEVEL
045-420
LEFT INPUT
11
C101
2.2µF 25 VNP
R103
47.5K
C103
39
.75V
2.5V
R101
27.4K
INPUT LEVEL S101
RIGHT/MONO INPUT
14
C102
2.2µF 25 VNP
R104
47.5K
C104
47
7.5V
2.5V
R102
27.4K
STEREO
S102
MODE
MONO
GND
4
5
8
9
12
13
ORN/WHT
10
RIGHT OUTPUT
BRN/WHT
7
LEFT OUTPUT
V10/WHT
6
MONO INPUT
YEL/WHT
3
MONO OUTPUT
BLU/WHT
11.4V
1
RIGHT POWER GUARD DRIVE
WHT
11.4V
2
LEFT POWER GUARD DRIVE

C502

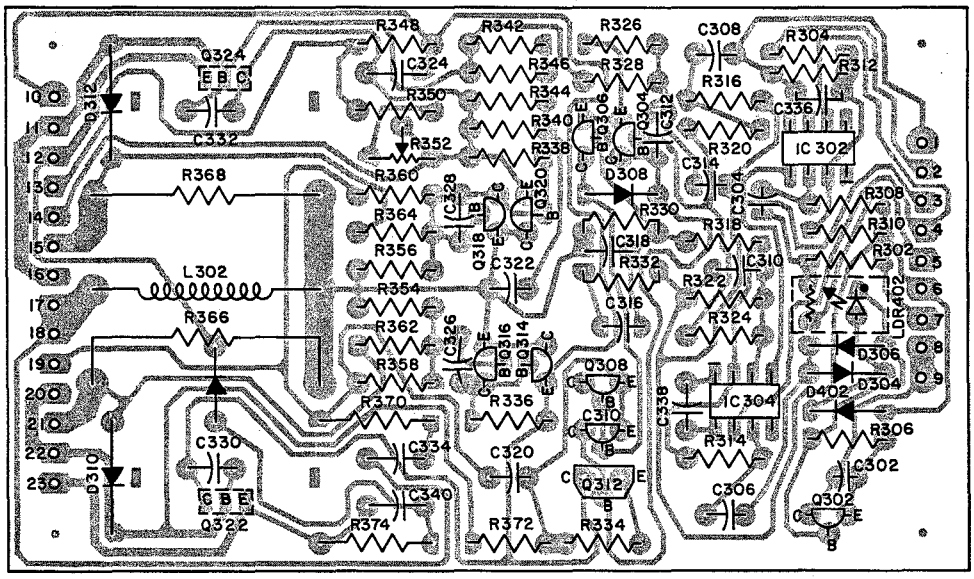


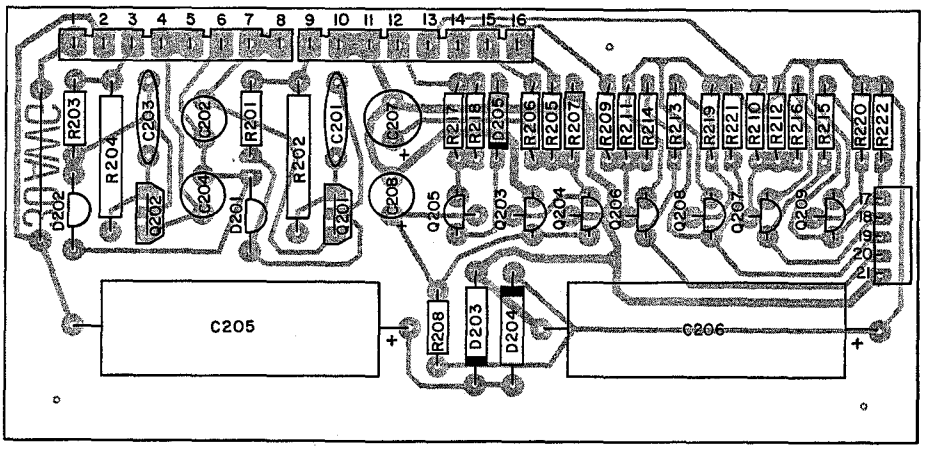
LEFT DRIVER PC BOARD
045-391


R347
R341
R325
C307
R303
Q323
E B C
C323
R345
R327
R311
R349
R343
R315
C335
C331
R339
Q305
Q303
C311
R351
R337
R319
IC301
C313
R367
R359
D307
R307
R363
C327
Q319
R329
R309
R317
R355
C317
R331
R301
C309
C321
R353
C315
R321
L301
R323
R365
R361
C325
Q315
Q313
Q307
R357
D305
D303
R335
C337
IC303
R369
D301
R305
C329
C333
C319
R313
C301
C339
C305
Q311
Q301
R373
R371
R333
Q321
C B E
B C E
E B C
C B E
B C E
C B E
C B E
C B

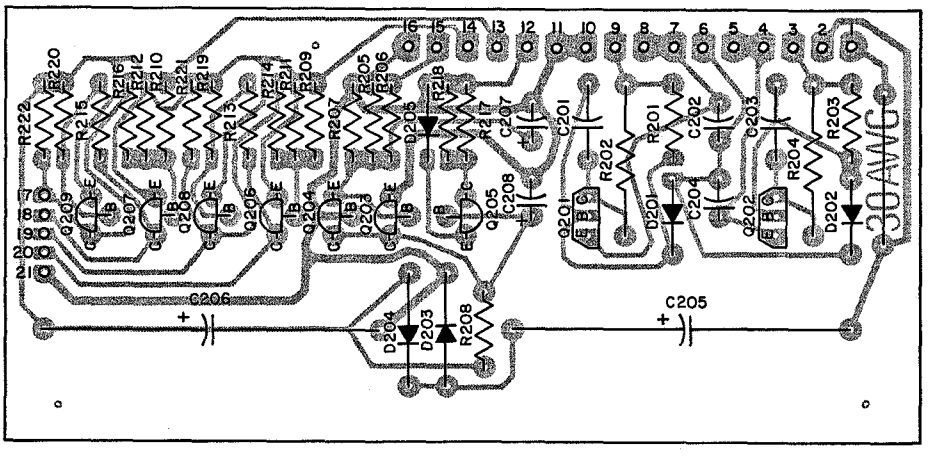


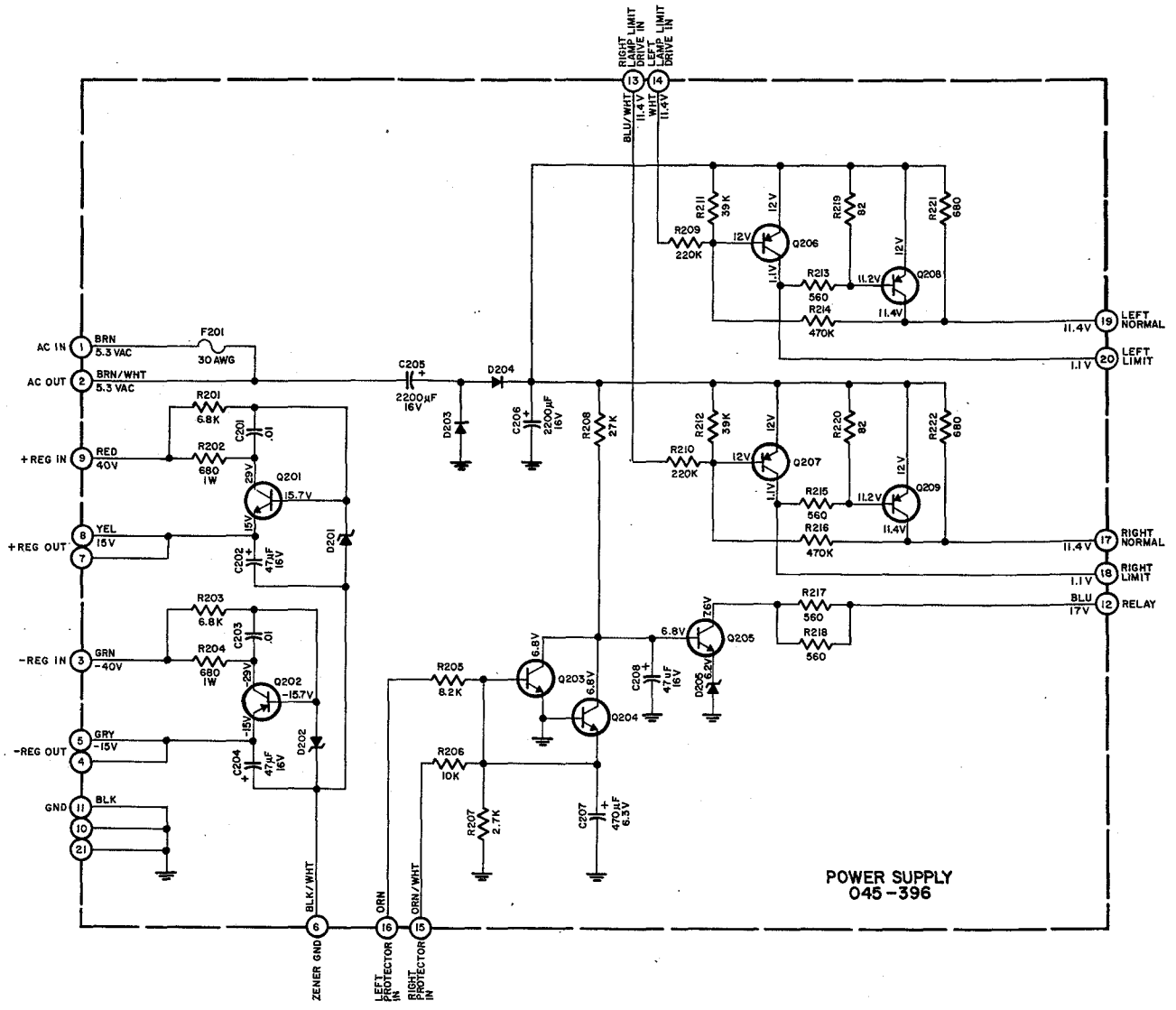
RIGHT DRIVER PC BOARD
045-391



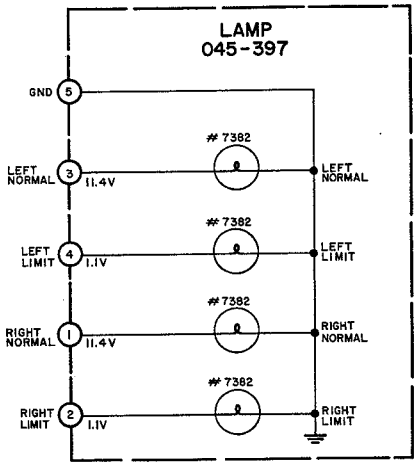


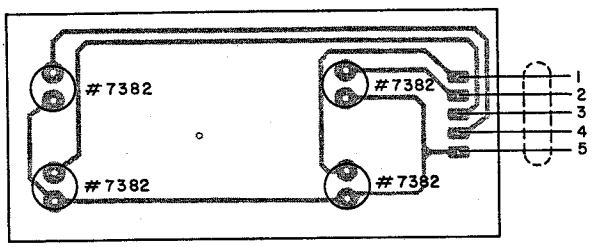
POWER SUPPLY PC BOARD
045396

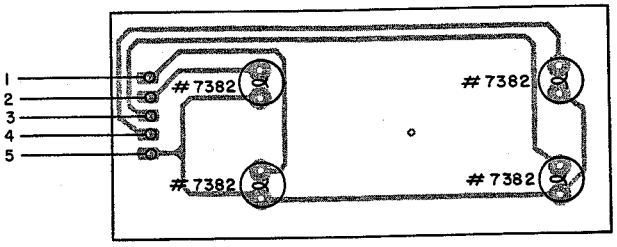



RIGHT LAMP LIMIT DRIVE IN
LEFT LAMP LIMIT DRIVE IN
BLU/WHT 11.4V
WHT 11.4V
AC IN 1 BRN 5.3 VAC
F201 30 AWG
AC OUT 2 BRN/WHT 5.3 VAC
+REG IN 9 RED 40V
+REG OUT 8 YEL 15V
7
-REG IN 3 GRN -40V
-REG OUT 5 GRY -15V
4
GND 11 BLK
10
21
R201 6.8K
C201 .01
R202 680 1W
Q201 15.7V
C202 47µF 16V
D201
R203 6.8K
C203 .01
R204 680 1W
Q202 -15.7V
C204 47µF 16V
D202
BLK/WHT
ZENER GND 6
C205 2200µF 16V
D204
D203
C206 2200µF 16V
R208 27K
R205 8.2K
Q203
Q204
R206 10K
R207 2.7K
C207 470µF 6.3V
C208 47µF 16V
Q205
D205
R217 560
R218 560
ORN
LEFT PROTECTOR IN 16
ORN/WHT
RIGHT PROTECTOR IN 15
R209 220K
R211 39K
Q206
R213 560
R214 470K
R219 82
R221 680
Q208
11.4V 19 LEFT NORMAL
1.1V 20 LEFT LIMIT
R210 220K
R212 39K
Q207
R215 560
R216 470K
R220 82
R222 680
Q209
11.4V 17 RIGHT NORMAL
1.1V 18 RIGHT LIMIT
BLU 17V 12 RELAY
POWER SUPPLY
045-396

C502

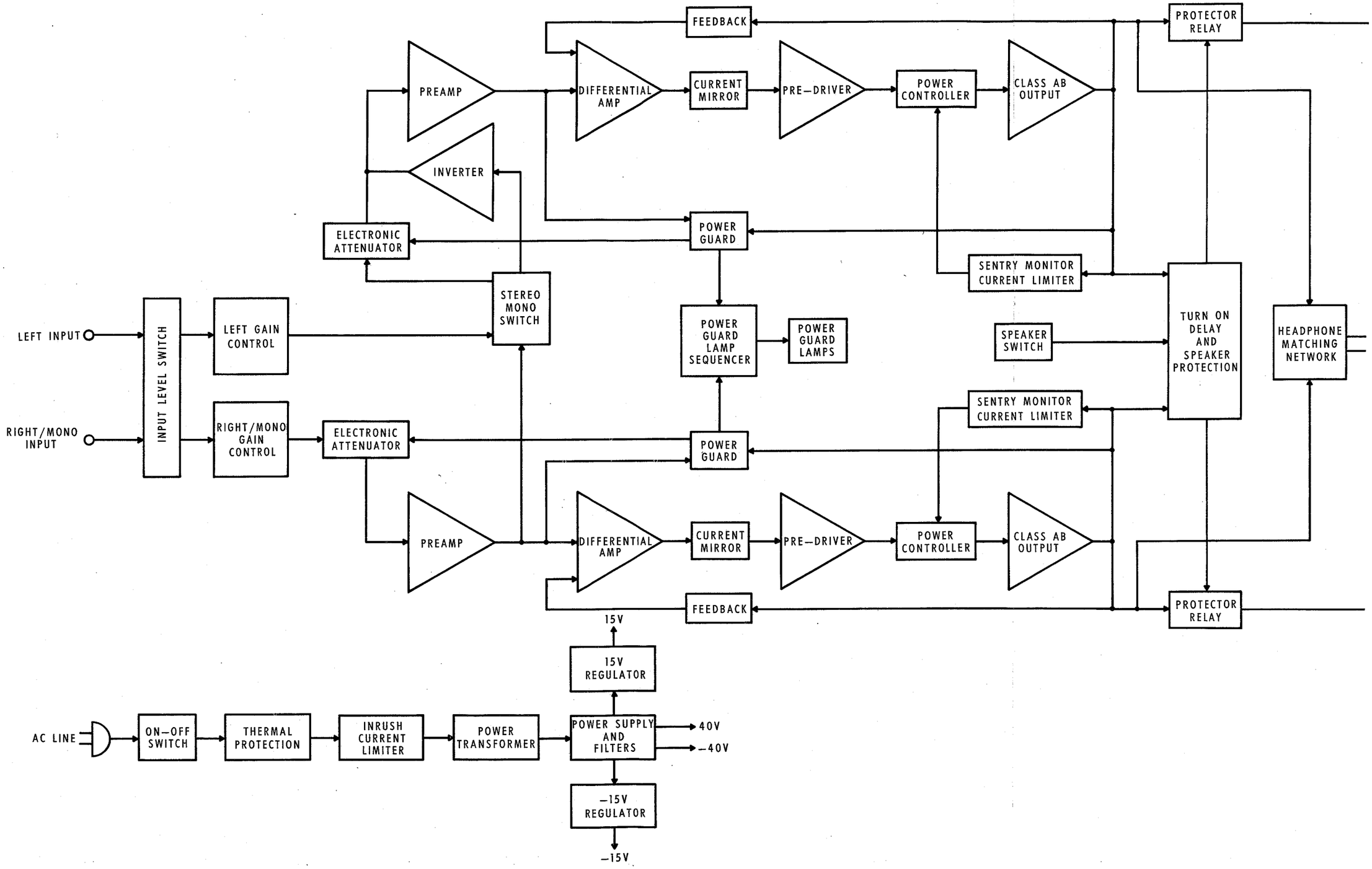


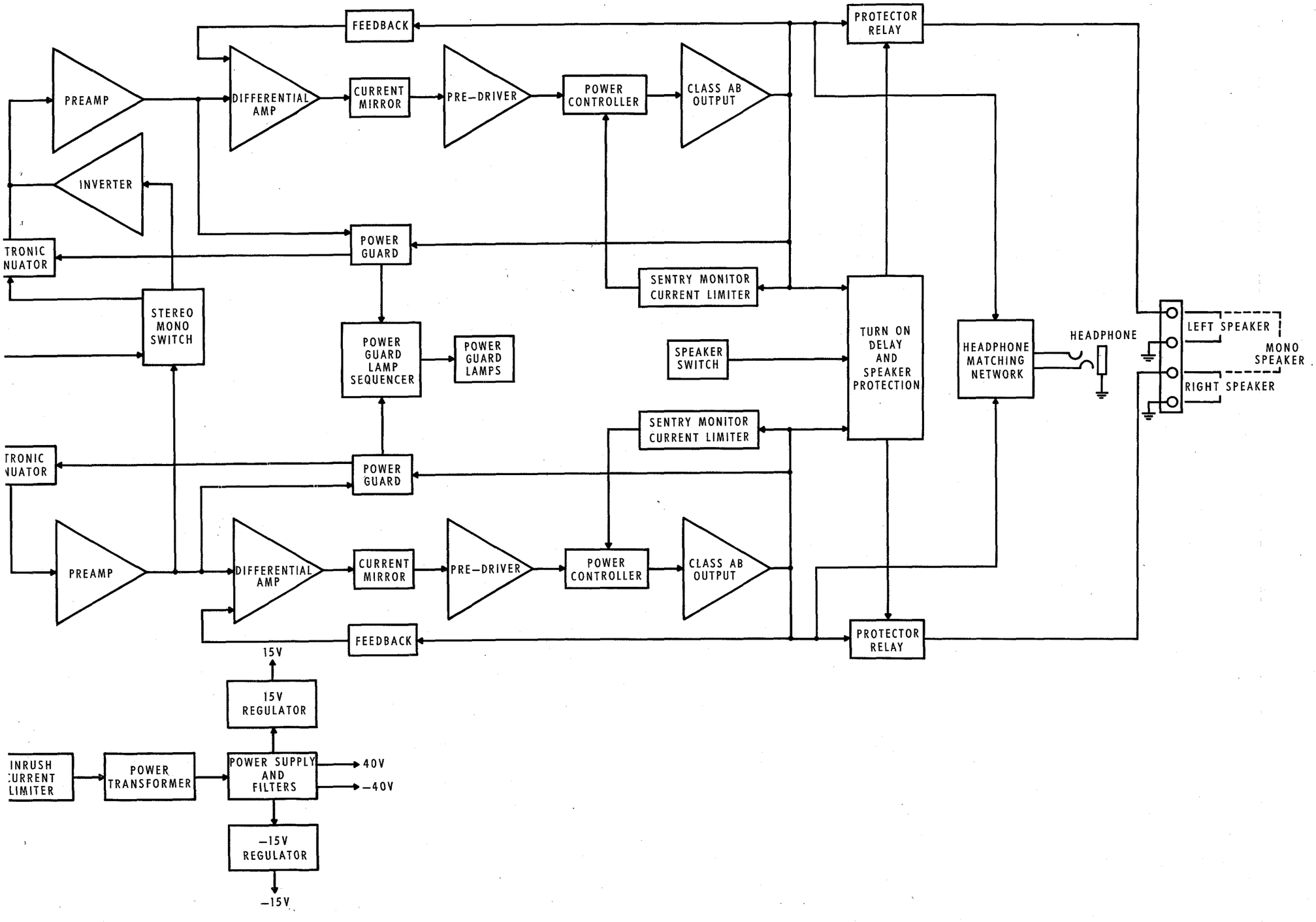




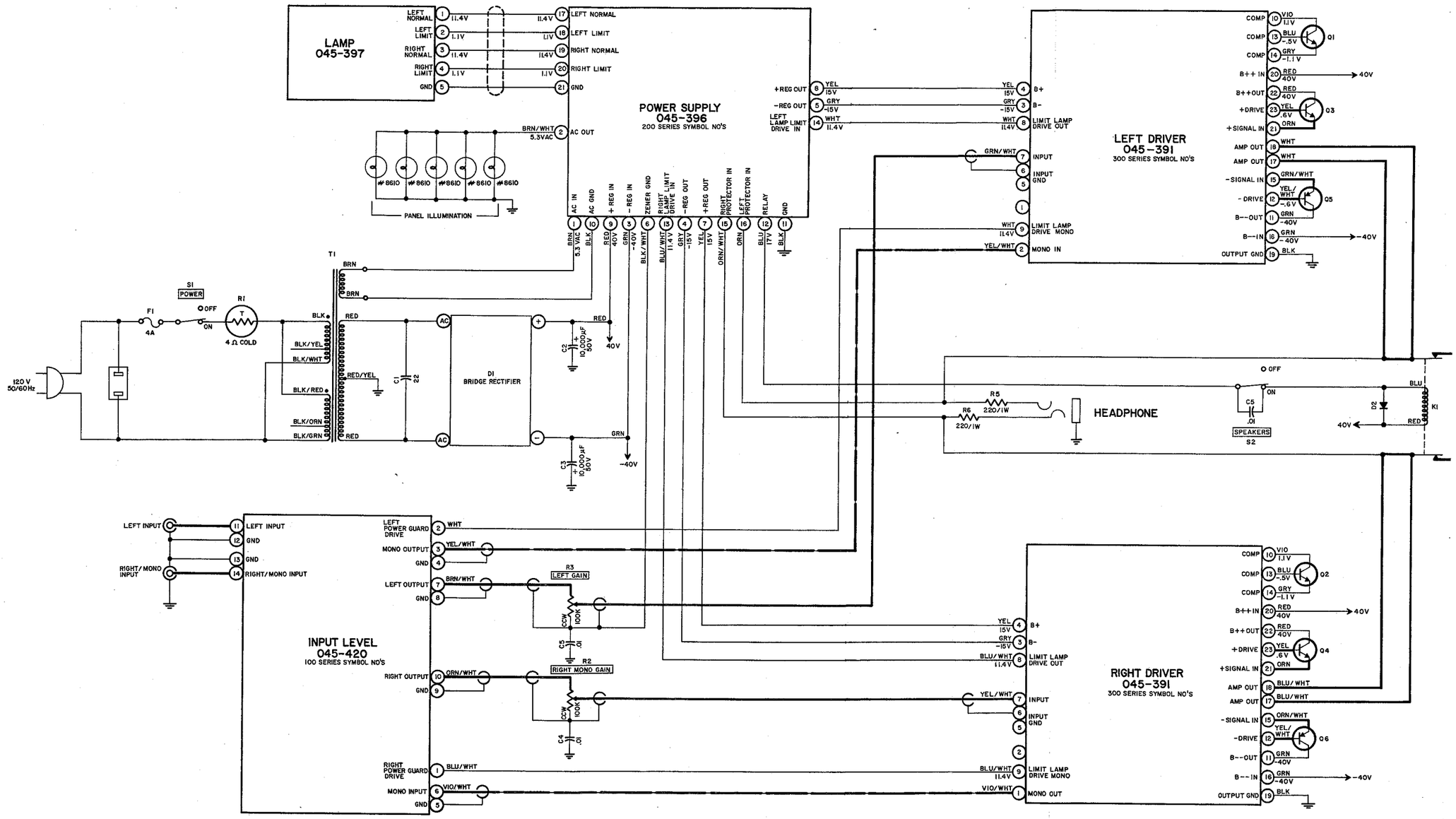
LAMP PC BOARD
045397

NDICATOR

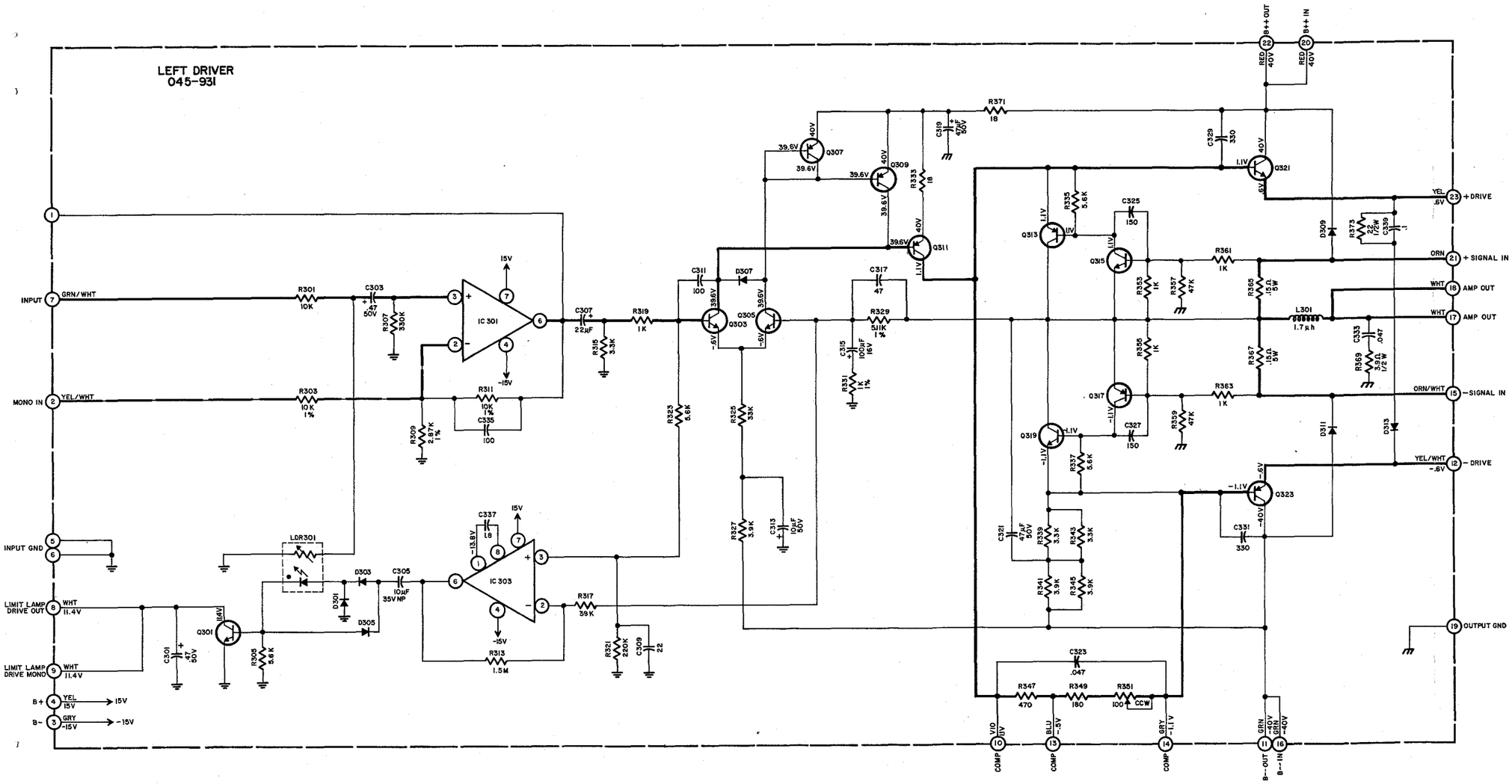

FEEDBACK
PROTECTOR RELAY
PREAMP
DIFFERENTIAL AMP
CURRENT MIRROR
PRE–DRIVER
POWER CONTROLLER
CLASS AB OUTPUT
INVERTER
ELECTRONIC ATTENUATOR
POWER GUARD
SENTRY MONITOR CURRENT LIMITER
STEREO MONO SWITCH
LEFT INPUT
INPUT LEVEL SWITCH
LEFT GAIN CONTROL
POWER GUARD LAMP SEQUENCER
POWER GUARD LAMPS
SPEAKER SWITCH
TURN ON DELAY AND SPEAKER PROTECTION
HEADPHONE MATCHING NETWORK
RIGHT/MONO INPUT
RIGHT/MONO GAIN CONTROL
ELECTRONIC ATTENUATOR
POWER GUARD
SENTRY MONITOR CURRENT LIMITER
PREAMP
DIFFERENTIAL AMP
CURRENT MIRROR
PRE–DRIVER
POWER CONTROLLER
CLASS AB OUTPUT
FEEDBACK
PROTECTOR RELAY
15V
15V REGULATOR
AC LINE
ON–OFF SWITCH
THERMAL PROTECTION
INRUSH CURRENT LIMITER
POWER TRANSFORMER
POWER SUPPLY AND FILTERS
40V
–40V
–15V REGULATOR
–15V



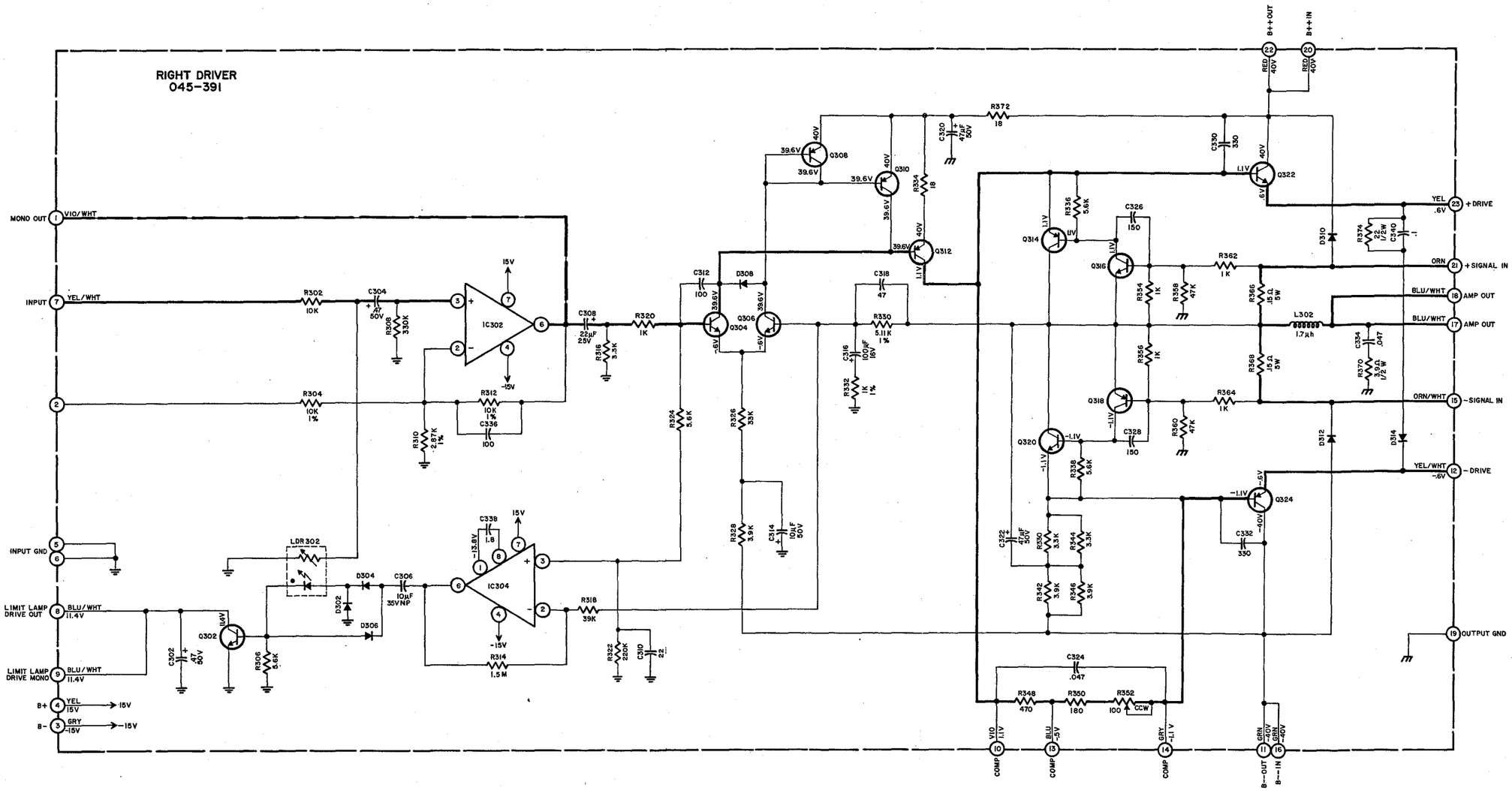
BLOCK DIAGRAM



INTERCONNECT



LEFT CHANNEL DRIVER



RIGHT CHANNEL DRIVER

REPLACEMENT PARTS

All parts not listed are common items obtainable from radio parts jobbers.

Replacement parts may be obtained when ordered by PART NUMBER from:

McIntosh Laboratory, Inc.
Customer Service Department
2 Chambers Street
Binghamton, New York 13903
(Telephone 607-723-3512)

Symbol Number	Description	Part Number
	DIODES	
D2	Si. signal diode	070-031
D201,202	Zener diode	070-089
D203,204	Si. signal diode	070-031
D205	Zener diode	070-085
D301,302	Si. signal diode	070-047
D303,304	Si. signal diode	070-047
D305,306	Si. signal diode	070-047
D307,308	Si. signal diode	070-047
D309,310	Si. signal diode	070-031
D311,312	Si. signal diode	070-031
D313,314	Si. signal diode	070-098
	CAPACITORS	
C2,3	Elect. Cap. 10000μF 50V	066-249
	INTEGRATED CIRCUITS	
IC301,302	Integrated circuit	133-066
IC303,304	Integrated circuit	133-068
	TRANSISTORS	
Q1,2	Si. NPN Transistor	132-143
Q3,4	Si. NPN Power transistor	132-188
Q5,6	Si. PNP Power transistor	132-189
Q201	Si. NPN transistor	132-149
Q202	Si. PNP transistor	132-148
Q203,204	Si. NPN transistor	132-143
Q205	Si. NPN transistor	132-185
Q206,207	PNP Darlington	132-182
Q208,209	Si. PNP transistor	132-150
Q301,302	Si. NPN transistor	132-092
Q303,304	Si. NPN transistor	132-185
Q305,306	Si. NPN transistor	132-185
Q307,308	Si. PNP transistor	132-096
Q309,310	Si. PNP transistor	132-096
Q311,312	Si. PNP transistor	132-148
Q313,314	Si. PNP transistor	132-150
Q315,316	Si. NPN transistor	132-143
Q317,318	Si. PNP transistor	132-150
Q319,320	Si. NPN transistor	132-134
Q321,322	NPN medium power	132-183
Q323,324	PNP medium power	132-148
	RESISTORS	
LDR301,302	LED photoresistor	144-070
	SWITCHES	
S1	Power switch	146-204
S2	Speaker switch	146-204
	POTENTIOMENTS	
R2	Right/Mono gain	134-363
R3	Left gain	134-363
	TRANSFORMERS	
T1	Power transformer	045-430
	FUSES	
F1	Fuse 4A	089-022
	RELAYS	
K1	Relay DPDT	087-019
	CHOKES	
L301,302	Choke 1.7μH	122-188
	LAMPS	
	Power guard #7382	058-061
	Front panel #8610	058-069
	FRONT PANEL & TRIM	
	Front panel	045-428
	Front panel glass	016-172
	End cap	018-204
	Power knob	090-156
	Speaker knob	090-156
	Right/mono gain knob	090-156
	Left gain knob	090-156
	MISCELLANEOUS	
	Fuseholder	178-106
	AC power cord	170-119
	Shipping carton	045-454
	Hardware package	045-427
	Panel lamp grommet	078-005
	6' audio cable	170-015